

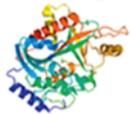
PROTEOMIC ASSESSMENT OF FLUID SHIFTS AND ASSOCIATION WITH VISUAL IMPAIRMENTS AND INTRACRANIAL PRESSURE IN TWIN ASTRONAUTS



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Specific Aims

To explore proteomic and genomic biomarkers underlying space flight-induced fluid shifts and visual impairment & intracranial pressure (VIIP) symptoms.



The proteome is the set of proteins produced by the genome at a given time. Proteomics captures the state of molecular and cellular processes at a specific time point.

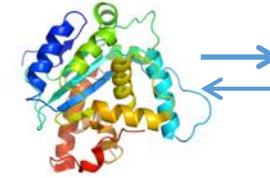
Implications of the Research for Space & Earth



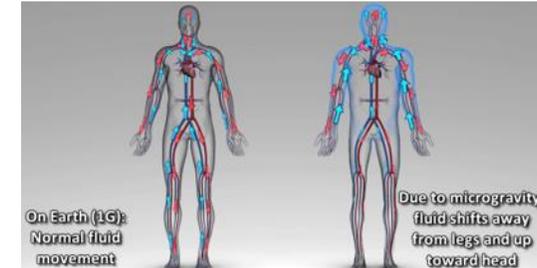
Space: Discovery of molecular pathways involved in the evolution of spaceflight adaptations related to fluid redistribution in-flight and the etiology of visual acuity and ocular changes in-flight and post-flight.



Earth: This project has broader impact on Earth-based clinical areas such as traumatic brain injury-induced elevations of intracranial pressure, hydrocephalus, and glaucoma



Blood Plasma proteins



In-flight Operations



- Blood Plasma collection
- Ultrasound measures of fluid shifts
- Intracranial Pressure
- Intraocular Pressure
- Ocular Structure
- Blood Pressure
- Heart Rate
- Vascular Resistance

Pre- and Post-flight Testing



- All in-flight operations and:
- Tissue hydration
- MRI